Carbon Crediting in US Agriculture & Forestry

International, National, & Local Issues

Idaho Carbon Sequestration Advisory Committee

Moscow, Idaho

July 9, 2002

Zach Willey

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Today's Subjects

- What Is Environmental Defense?
- Greenhouse Gas Types & Trends
- Importance of Carbon Sinks
- Intergovernmental Panel on Climate Change
- Kyoto Protocol
- US Domestic Policies
- Environmental Defense US Domestic Carbon Sinks Initiative

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What Is Environmental Defense?

- NGO, NYC headquarters
- 300,000 members
- 200 scientists, economists, attorneys and other professionals
- Projects in USA, Europe, Russia, China, Cuba, the Caribbean, Latin America, Africa & Antarctica
- $39.1 M 2001 budget

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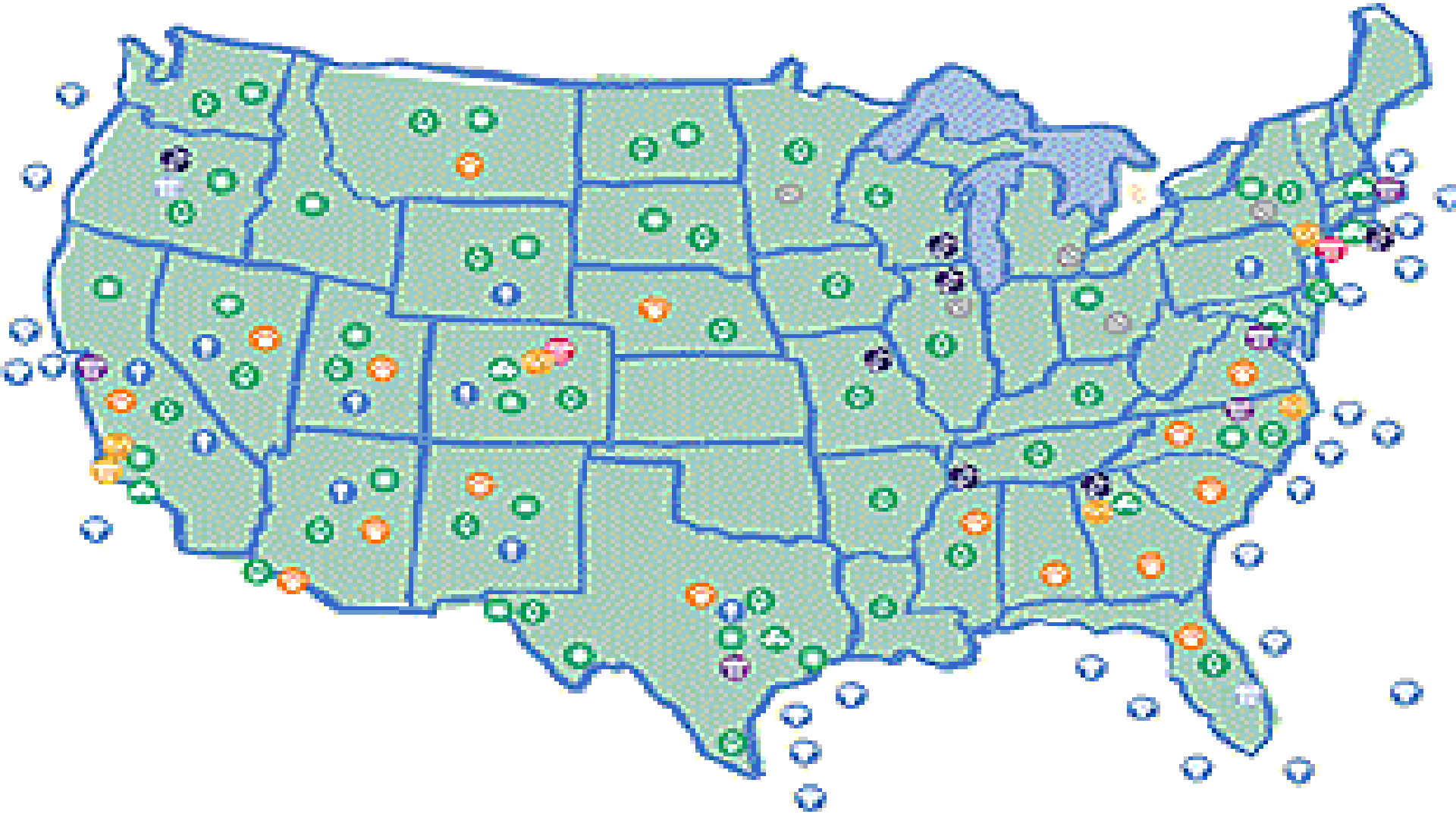
In the United States



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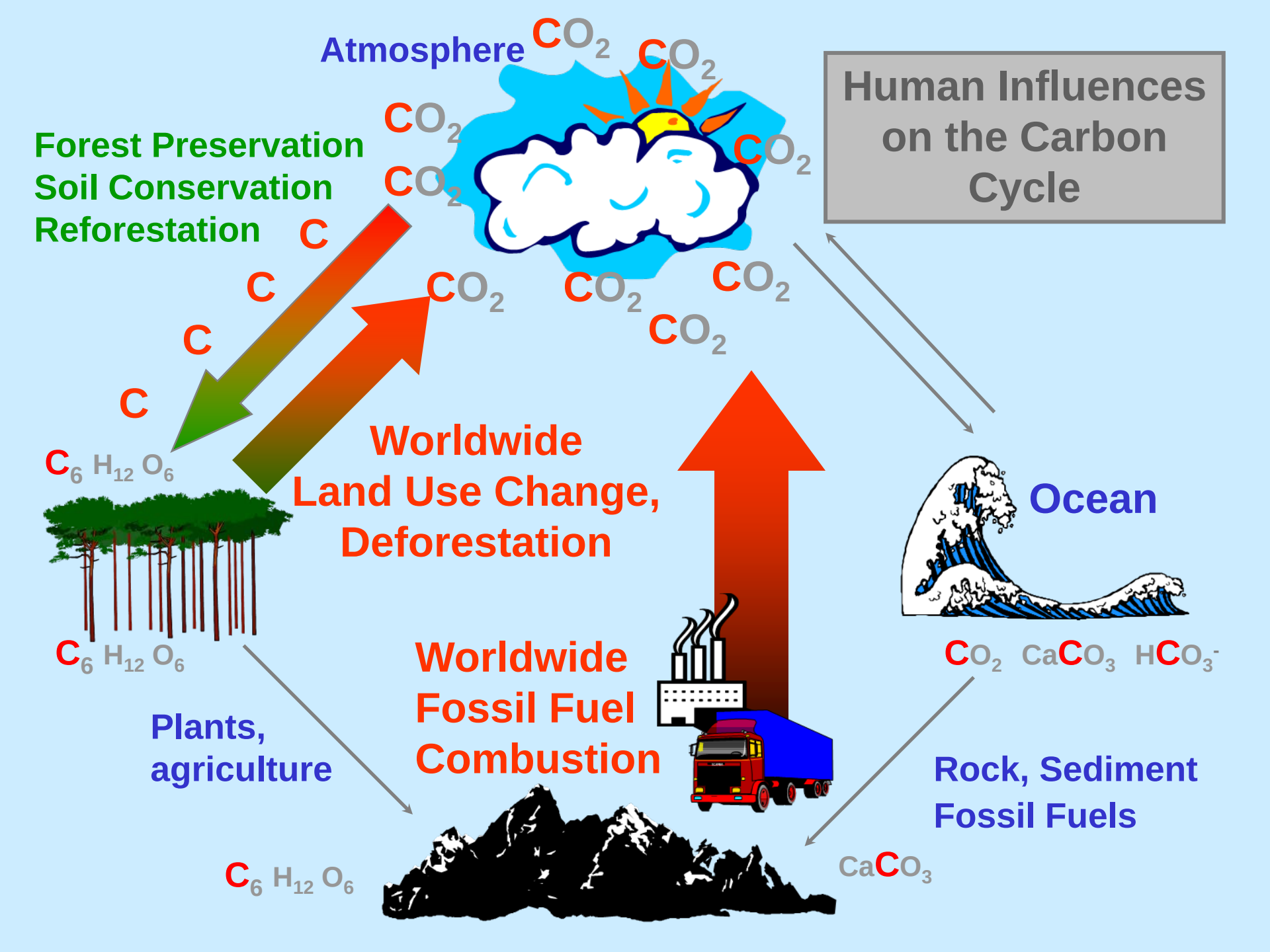
Program Goals

- *Stabilizing the Climate*
- *Preserving Species and Habitat*
- *Safeguarding the Oceans*
- *Protecting Human Health*

Human Influences on the Carbon Cycle



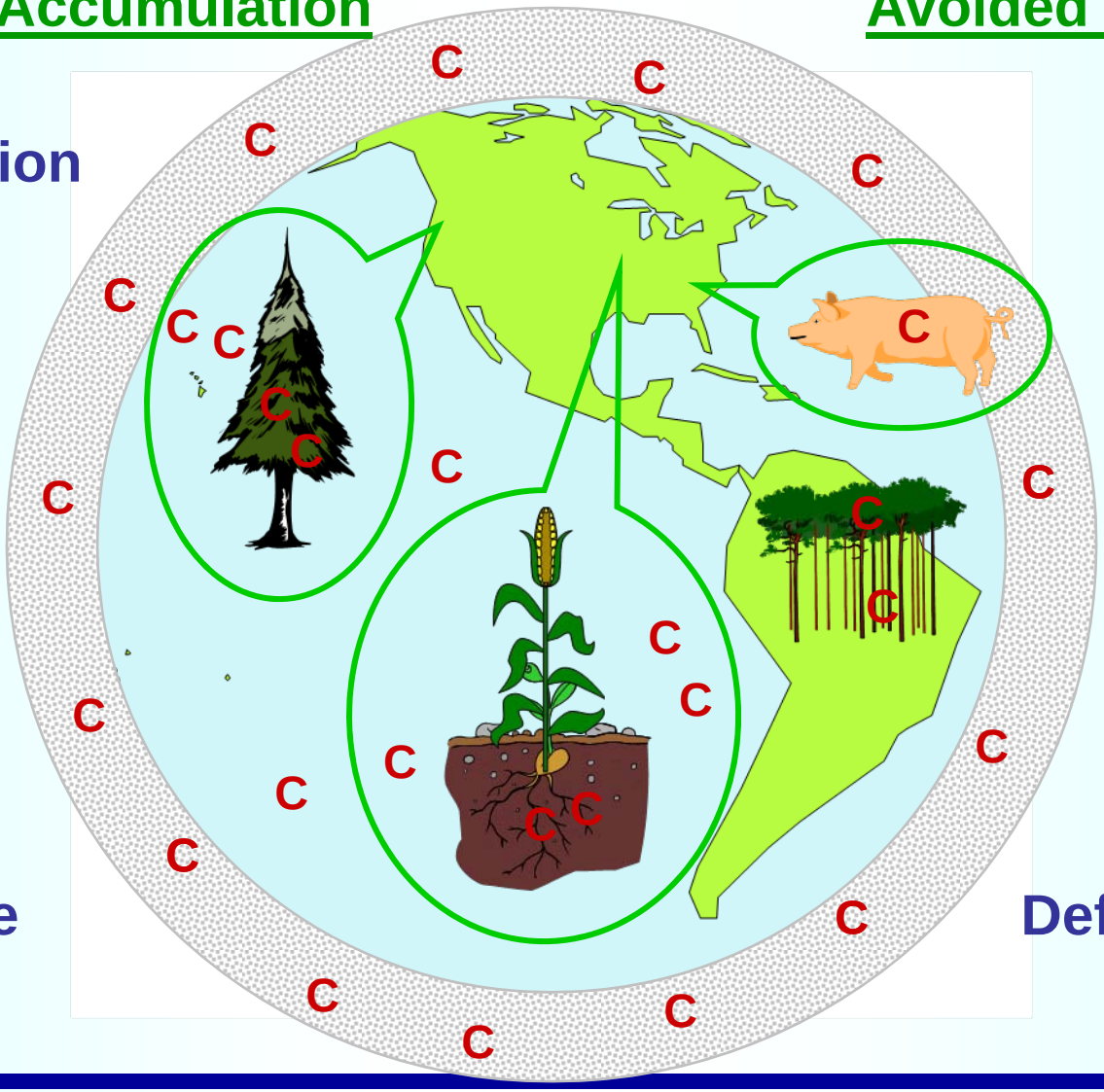
Storing Carbon in Trees and Soil *Anywhere in the World* Reduces Greenhouse Gases in the Atmosphere

Increased Accumulation

Avoided emissions

Reforestation

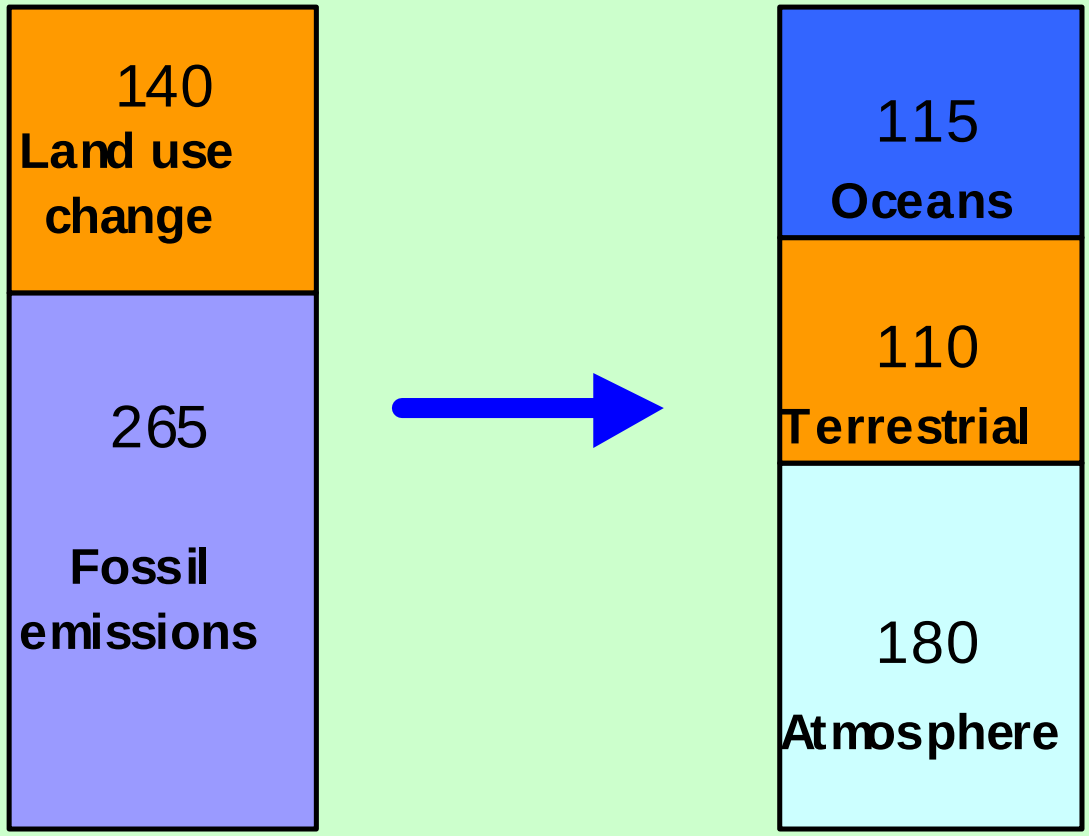
Methane Capture



No-till Agriculture

Avoided Deforestation

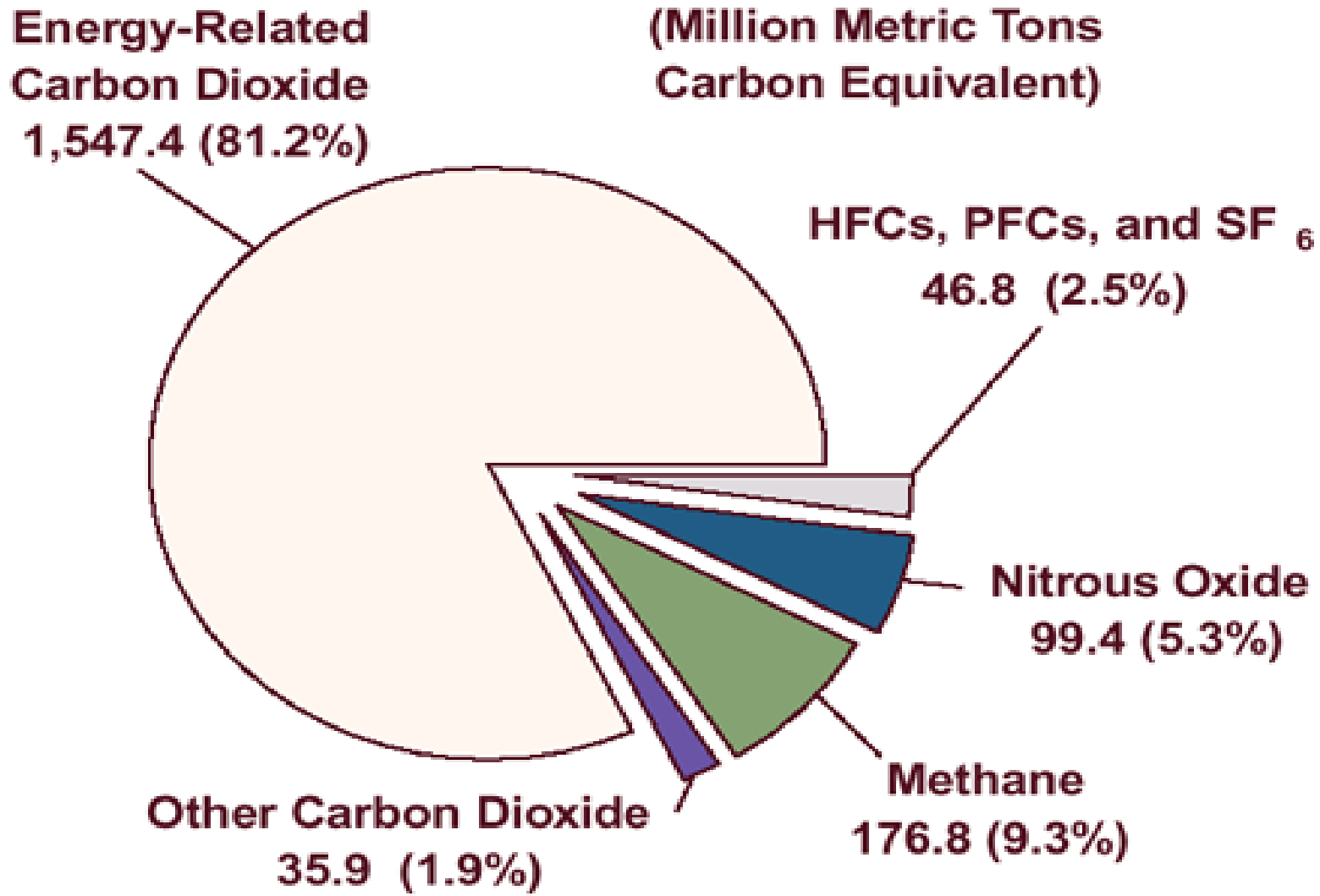
Carbon emissions and uptakes since 1800 (Gt C)



Greenhouse Gas Inventories

- **US Department of Energy** -- Energy Information Administration (EIA) -- Energy Policy Act 1992
- **IPCC National Greenhouse Gas Inventories Programme (IPCC-NGGIP)** since 1991, Intergovernmental Panel on Climate Change in conjunction with Organisation for Economic Co-operation and Development (OECD), World Meteorological Organization (WMO), U.N. Environment Programme (UNEP)

Figure ES1. U.S. Greenhouse Gas Emissions by Gas, 2000

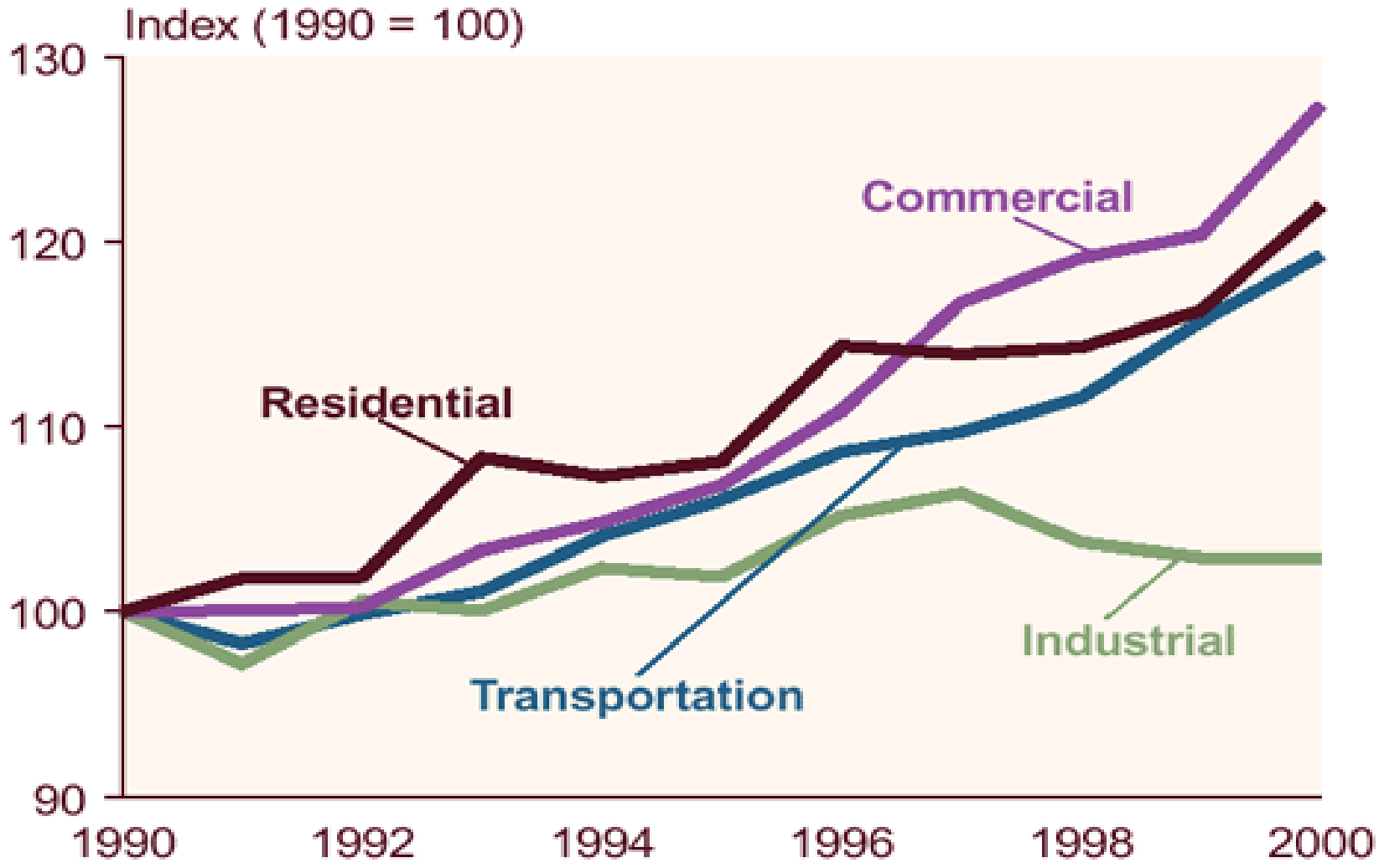


Source: EIA estimates presented in this report.

U.S. Anthropogenic Greenhouse Gas Emissions, 1990-2000

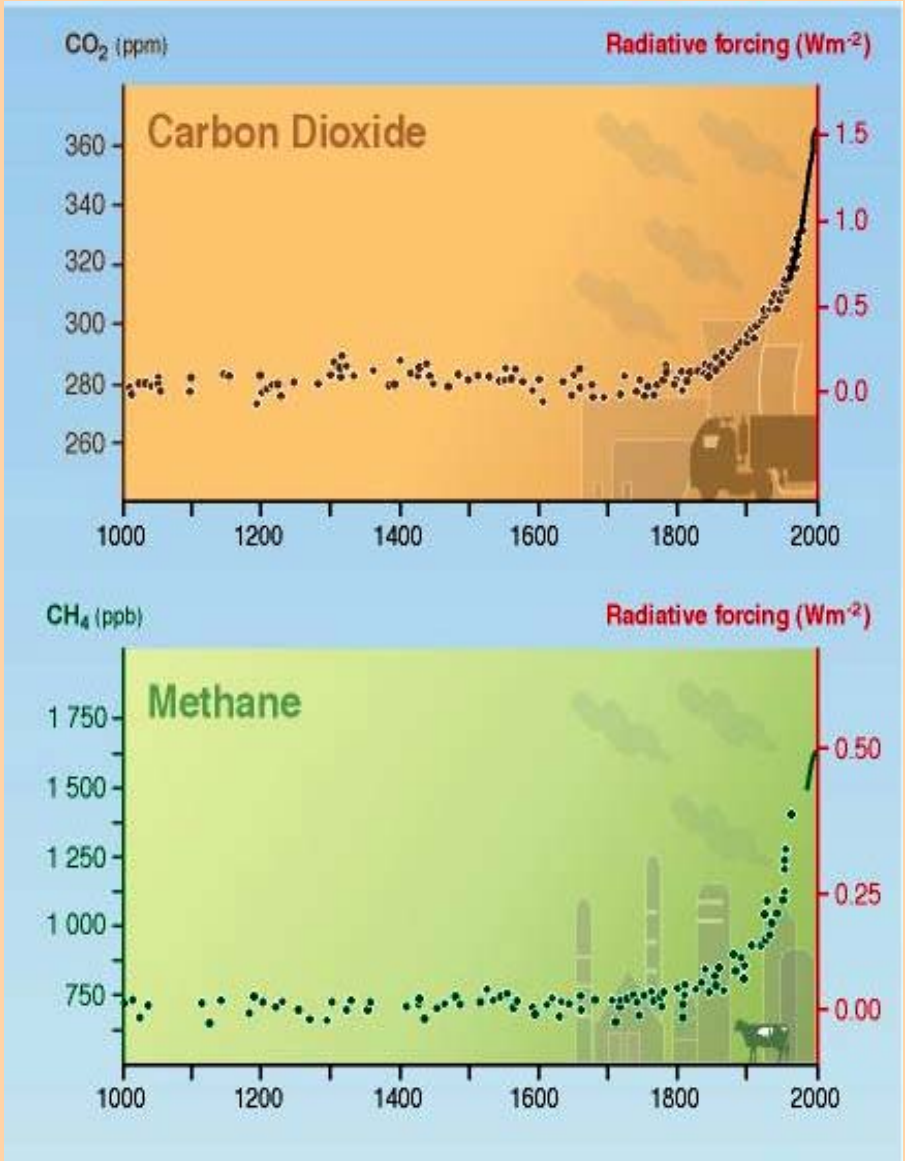
	Carbon Equivalent
Estimated 2000 Emissions (Million Metric Tons)	1,906.3
Change Compared to 1999 (Million Metric Tons)	46.1
Change from 1999 *(Percent)*	*2.5%*
Change Compared to 1990 (Million Metric Tons)	228.4
Change from 1990 *(Percent)*	*13.6%*
Average Annual Increase, 1990-2000 *(Percent)*	*1.3%*

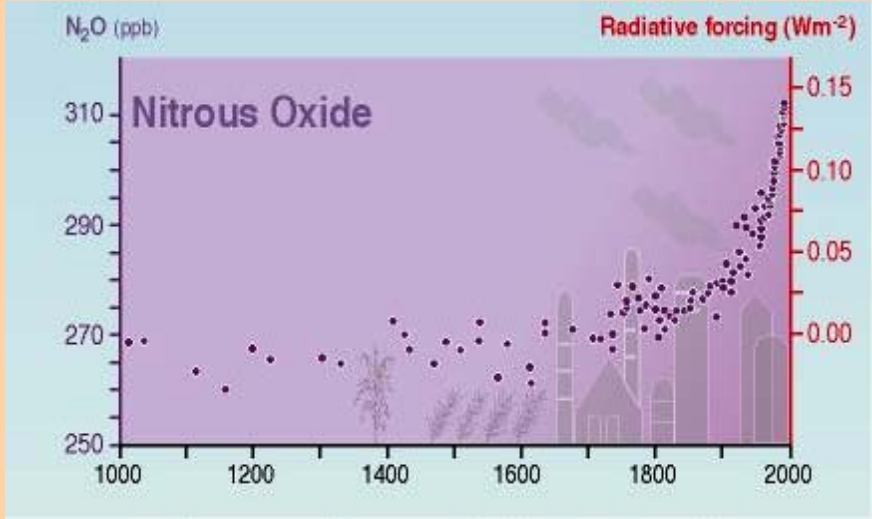
Figure ES3. U.S. Carbon Dioxide Emissions by Sector, 1990-2000



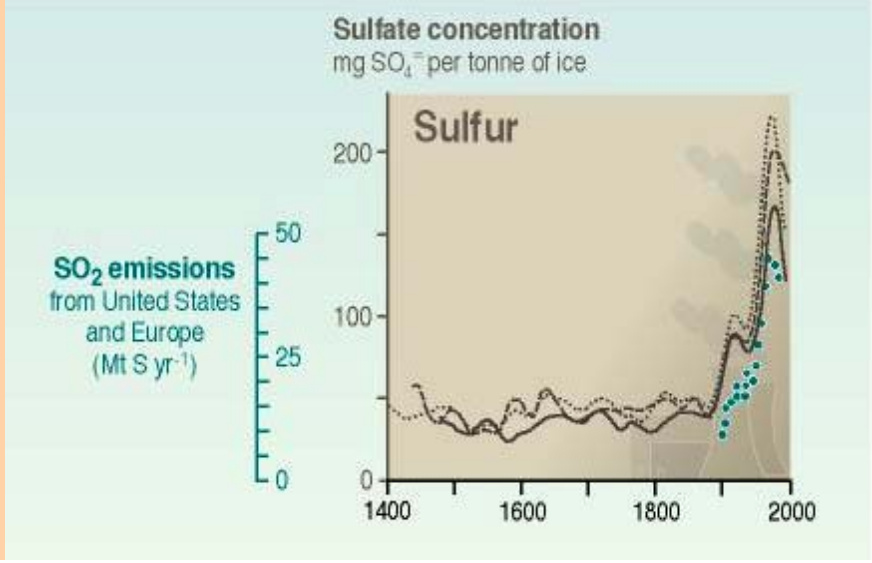
Sources: Estimates presented in this report.

Human activities have changed the composition of the atmosphere since the pre- industrial era

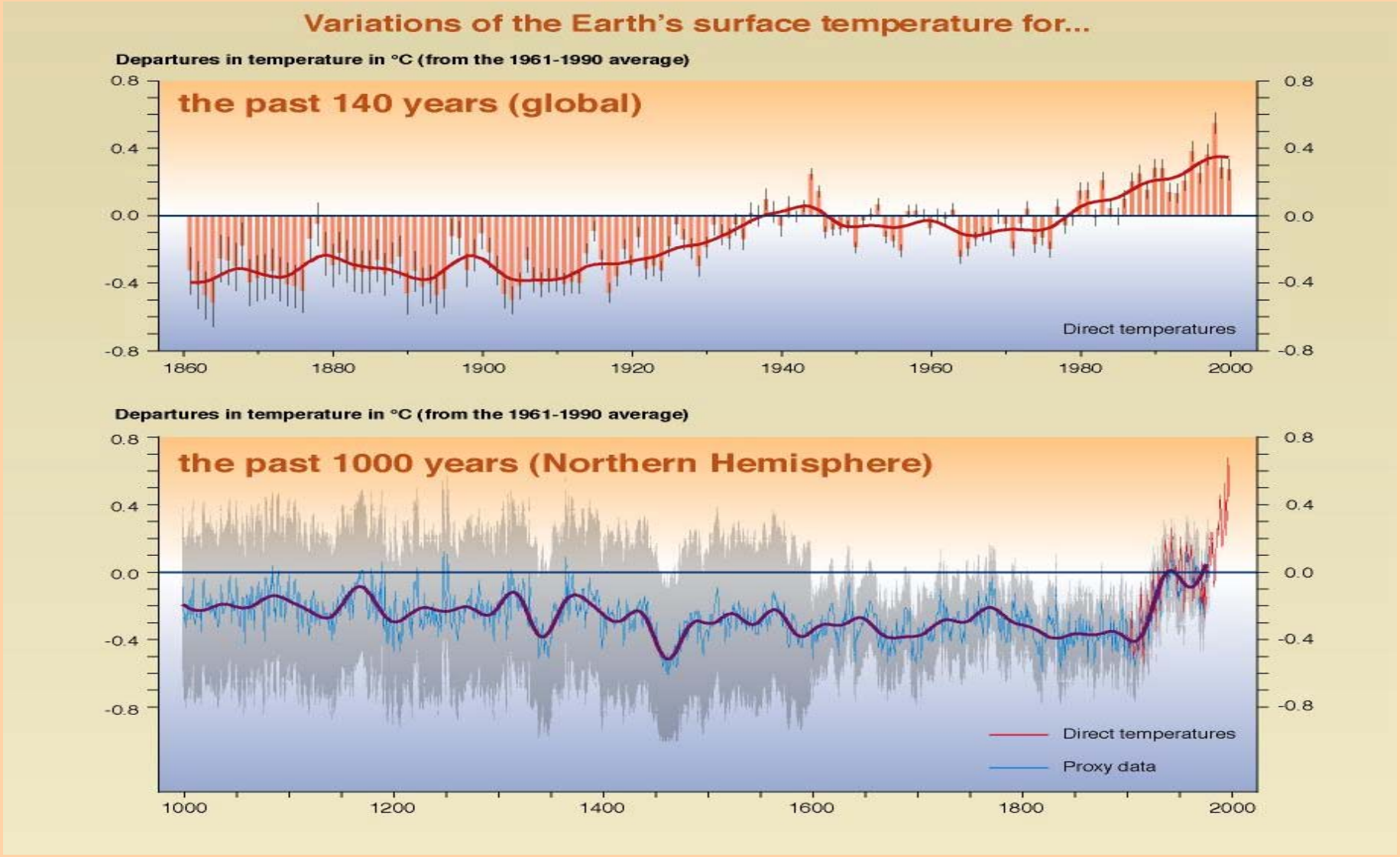




Sulfate aerosols deposited in Greenland ice



Global mean surface temperatures have increased



Plants absorb and store carbon, so loss of forests adds to CO_2 accumulation

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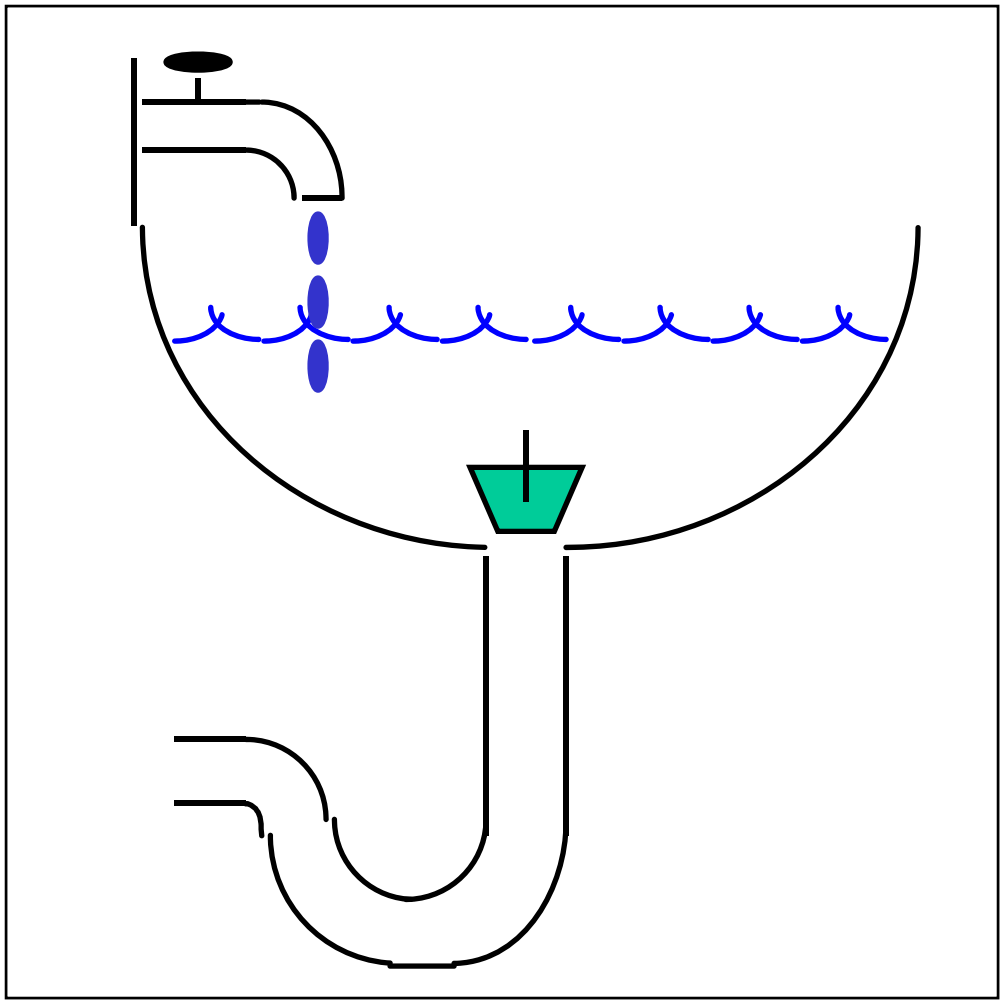
The atmosphere and the sink



water = CO_2

faucet = smokestacks, etc.

drain = ocean, forests

level = concentration in air

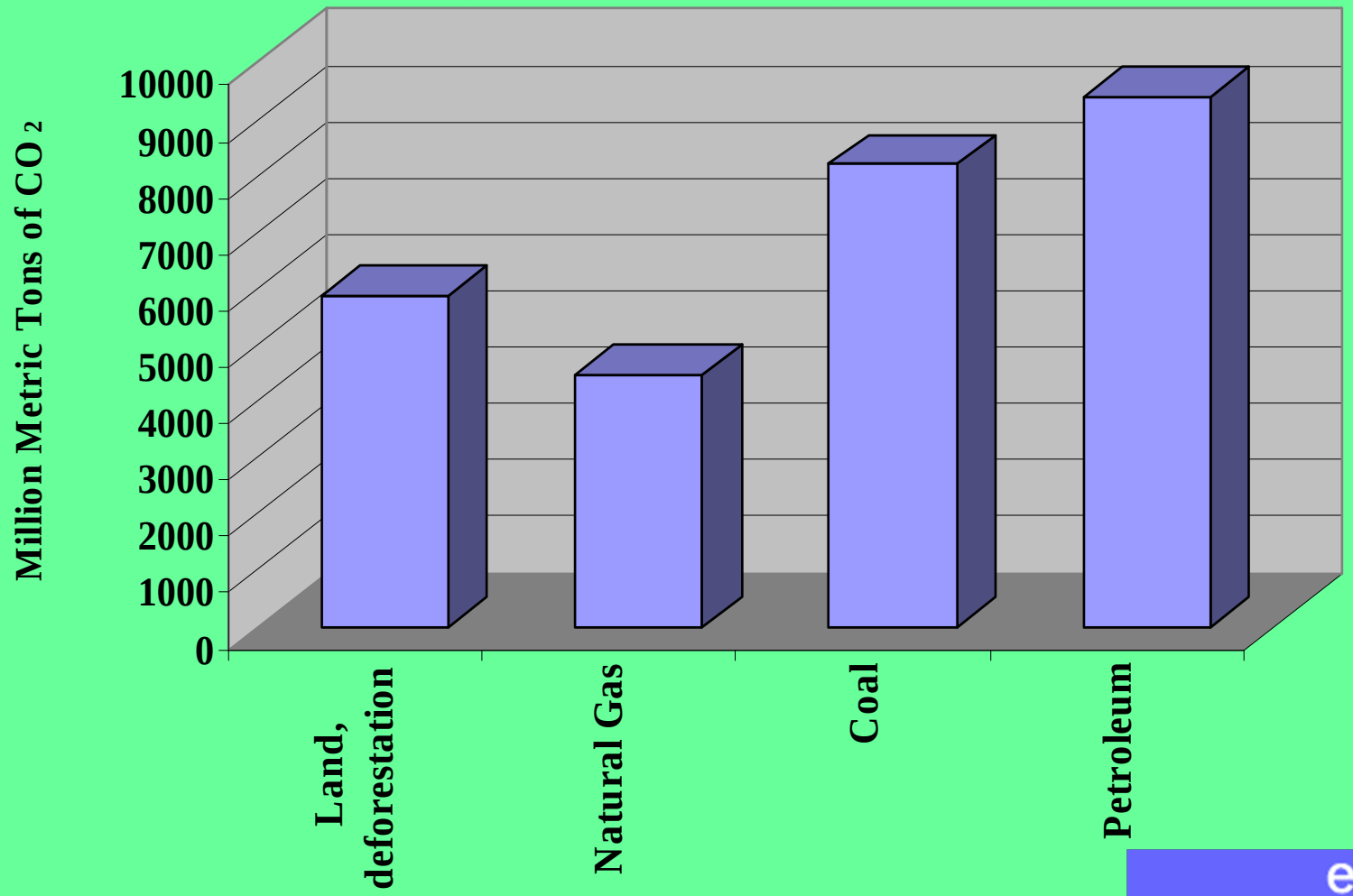
inflow = GHG emissions

top of sink = acceptable concentration

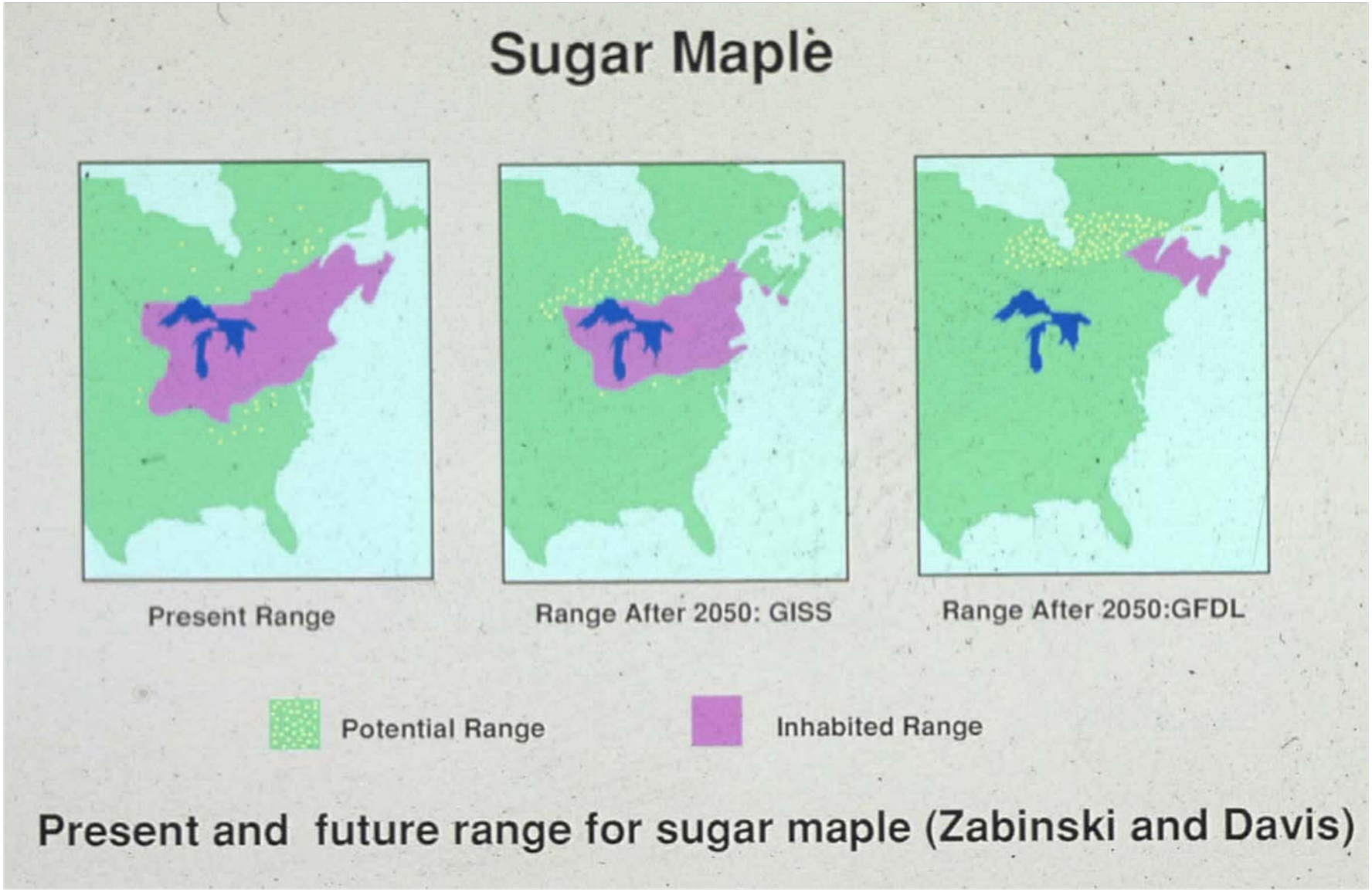
Question: What level of inflow (over time) will prevent a flood?

Why Is This Important Environmentally?

Figure 2. Comparison of Mean Annual Global Emissions from Deforestation (1989-1995) and Fossil Fuels (1990-1999) source: IPCC; US DOE



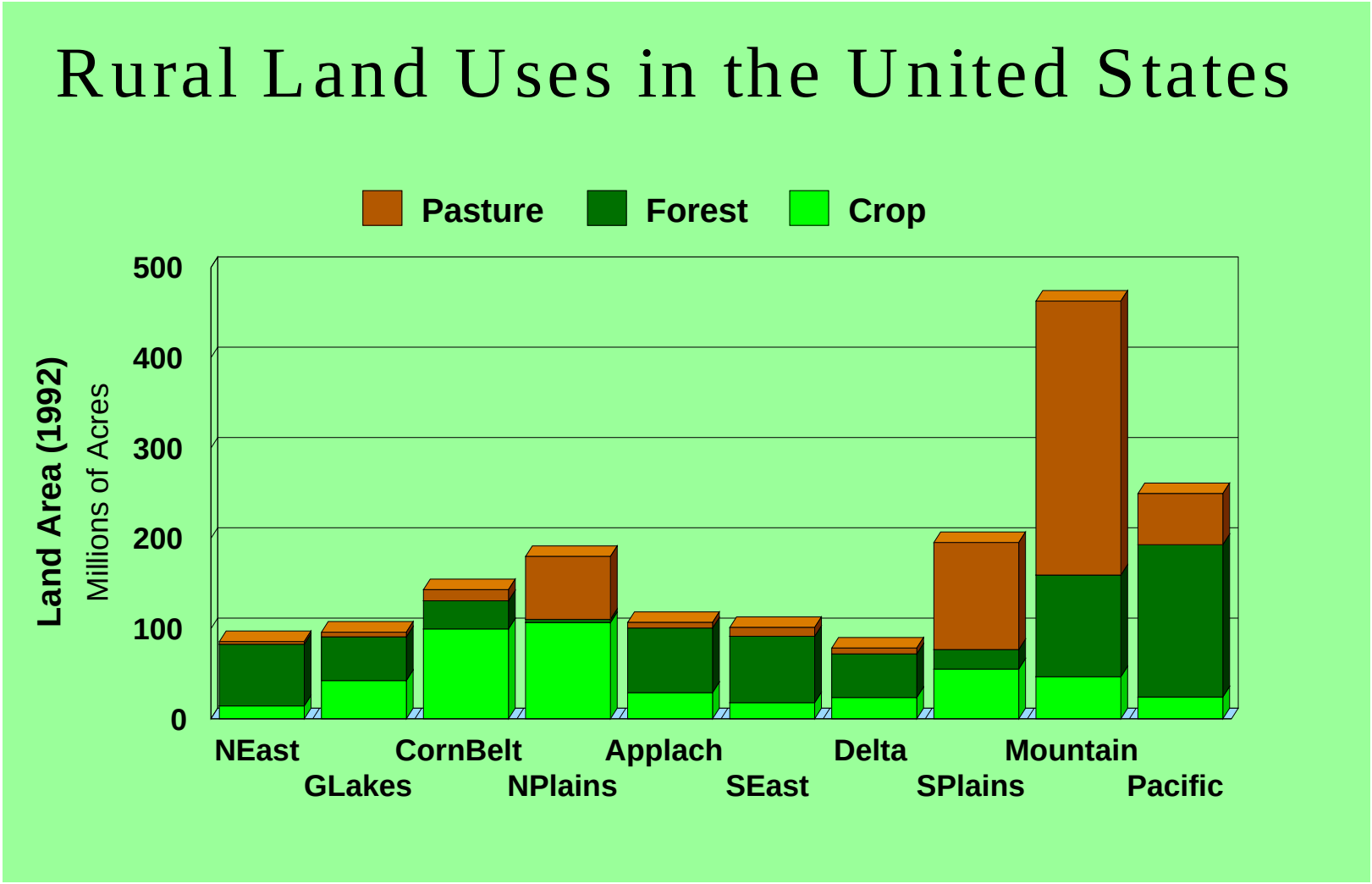
Ecosystems will change



Species are at risk

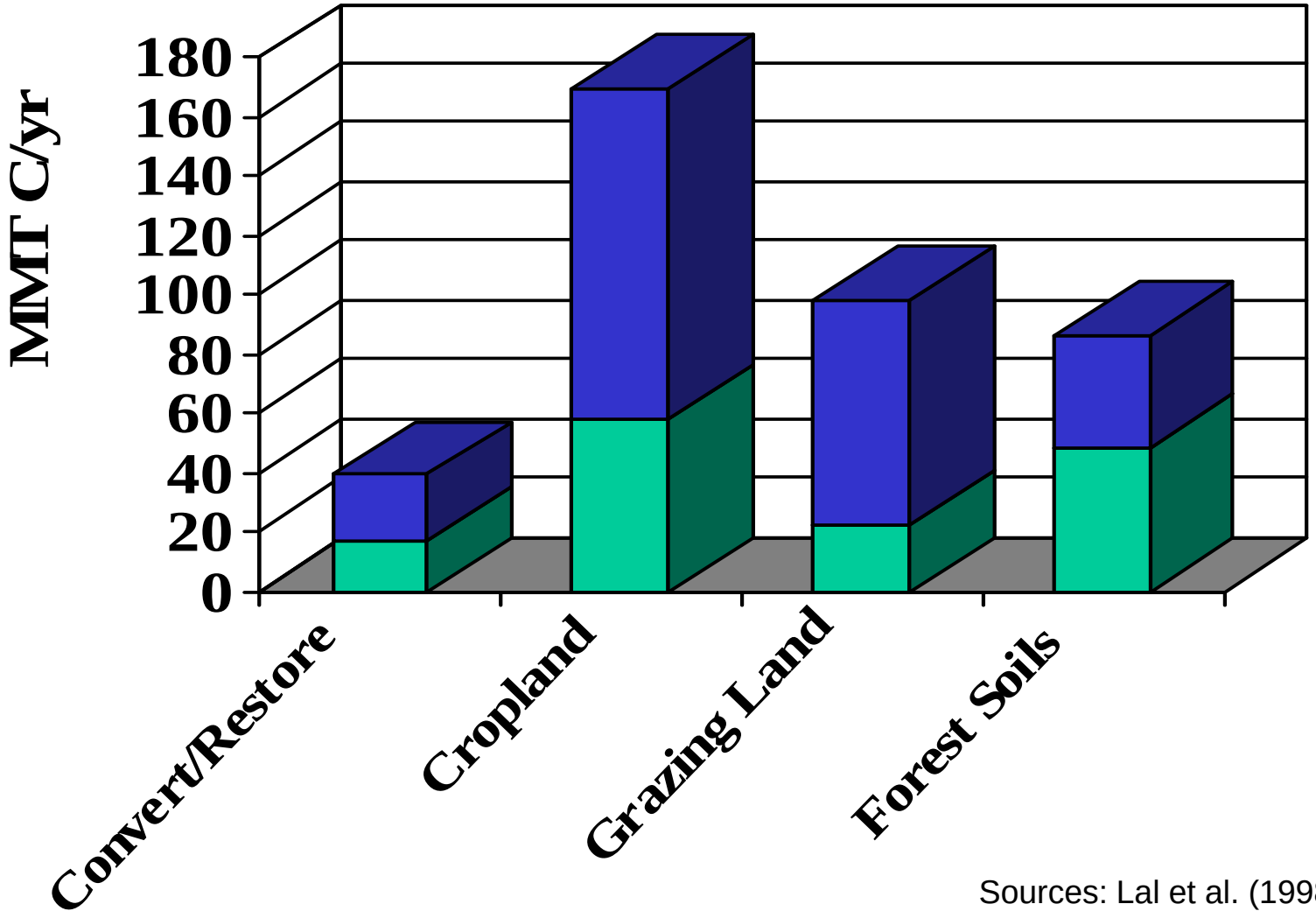
The Pacific Golden Plover spends its summers on the tundra and winters on Pacific atolls.

Why this is important economically in the US?



Potential Soil Carbon Sequestration in the US

from Changes and Improvements in Management

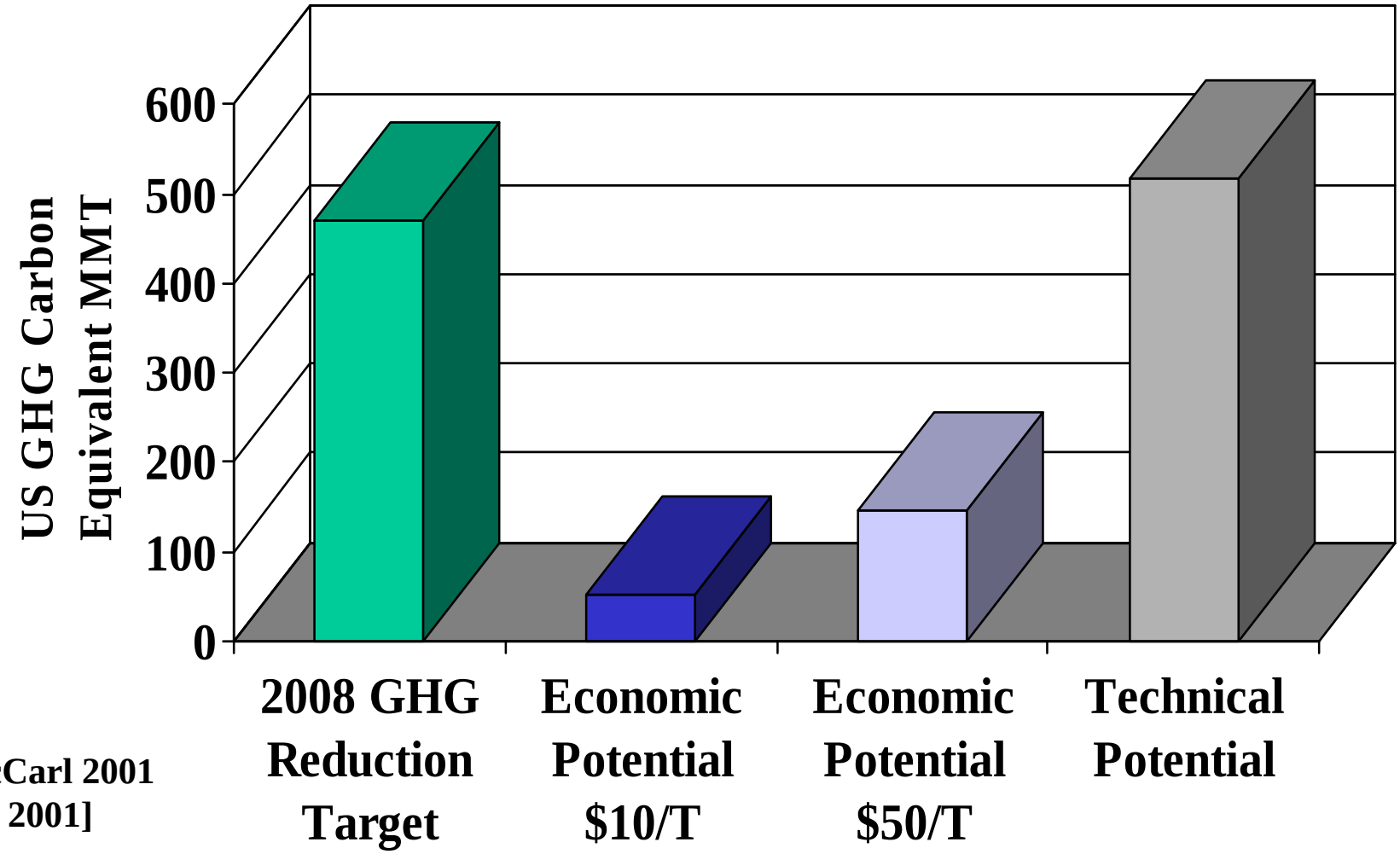


Sources: Lal et al. (1998);
Follett et al. (2000); Birdsey (2000)

What information do we have?

- Transacted values from:
  - $.031/ton CO_2
  - $25/ton CO_2
- Study values from:
  - **No cost**
  - **$200/ton**

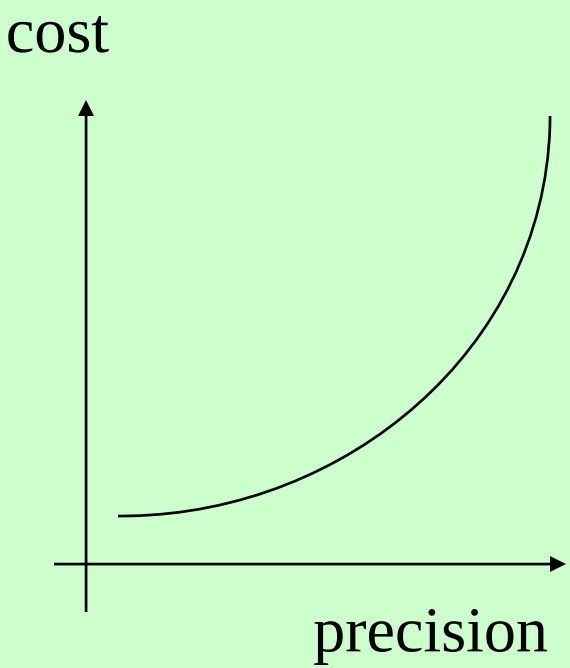
US Carbon Sinks Potentials vs. 2008 US GHG Reduction Target



[Sources:
Econ: McCarl 2001
Tech: Lal 2001]

Monitoring Costs

- Are Variable, i.e. there is a Relationship between precision and cost
- Are a key component of transactions costs
- Are a key aspect of quality/integrity



Co-benefits: Valuing Ecosystem Services

- Carbon sequestration as a service – water quality, wildlife habitat
- Markets often fail to value such services
- Valuing carbon could leverage enormous resources for conservation
- Valuing carbon is positive for most ecosystems

Summary on Sinks

- Sinks are an important emissions source
- Sinks can add value to US agricultural and other lands & new income opportunity for landowners
- Sinks have the potential to act as a bridge to a lower carbon intensity future
- Sinks can also be extremely cost-effective producing significant co-benefits
- BUT Sinks remain highly controversial

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The Road to Kyoto

- **1972 --** Declaration of the United Nations Conference on the Human Environment, adopted at Stockholm
- **1988-91 --** UN Conference on Environment & Development -- General Assembly resolutions on protection of global climate for present and future generations
- **1989 --** General Assembly Resolution 44/206 on the possible adverse effects of sea-level rise on islands & coastal areas, particularly low-lying coastal areas & Resolution 44/172 on the implementation of the Plan of Action to Combat Desertification

The Road to Kyoto

- **1985-1990 --** Vienna Convention for the Protection of the Ozone Layer, 1985, and the Montreal Protocol on Substances that Deplete the Ozone Layer, 1987, as adjusted and amended in June 1990
- **1992** -- UN Framework Convention on Climate Change was signed by 154 states at Rio de Janeiro

Intergovernmental Panel on Climate Change

- Origin: World Meteorological Organization (WMO) and the UN Environment Programme (UNEP) established the Intergovernmental Panel on Climate Change (IPCC) in 1988
- Mission: Assess [peer reviewed and published scientific/technical literature] the scientific, technical and socio-economic information relevant for the understanding of the risk of human-induced climate change

IPCC Working Groups & Task Force

- **WG I** assesses scientific aspects of the climate system & climate change
- **WG II** addresses the vulnerability of socio-economic & natural systems to climate change, negative and positive consequences of climate change, and options for adapting
- **WG III** assesses options for limiting greenhouse gas emissions & mitigating climate change
- **The Task Force** on National Greenhouse Gas Inventories is responsible for the IPCC National GHG Inventories Programme

IPCC Assessment Reports Mission

- Provide scientific, technical and socio-economic advice to the world community, and in particular to the 170-plus Parties to the UNFCCC through its periodic assessment reports on the state of knowledge of causes of climate change, its potential environmental and socio-economic impacts and options for addressing

IPCC Assessment Reports
Key Results

- First Assessment Report (1990)
  - catalyzed establishing Intergovernmental Negotiating Committee for UN Framework Convention on Climate Change (INC) by the UN General Assembly
  - UNFCCC adopted in 1992 (Rio) & entered into force in 1994
  - UNFCCC provides the overall policy framework for addressing the climate change issue
- Second Assessment Report, Climate Change 1995
  - provided key input to the negotiations leading to the adoption of the Kyoto Protocol in 1997

IPCC Third Assessment Report – Climate Change 2001

Key Findings on Physical Effects

- ***The global average surface temperature has increased over the 20th century by about 0.6°C.***
- ***Temperatures have risen during the past four decades in the lowest 8 kilometers of atmosphere***
- ***Global average sea level has risen and ocean heat content has increased***
- ***Snow cover and ice extent have decreased***
- ***Concentrations of atmospheric greenhouse gases and their radiative forcing have continued to increase as a***

IPCC Third Assessment Report – Climate Change 2001

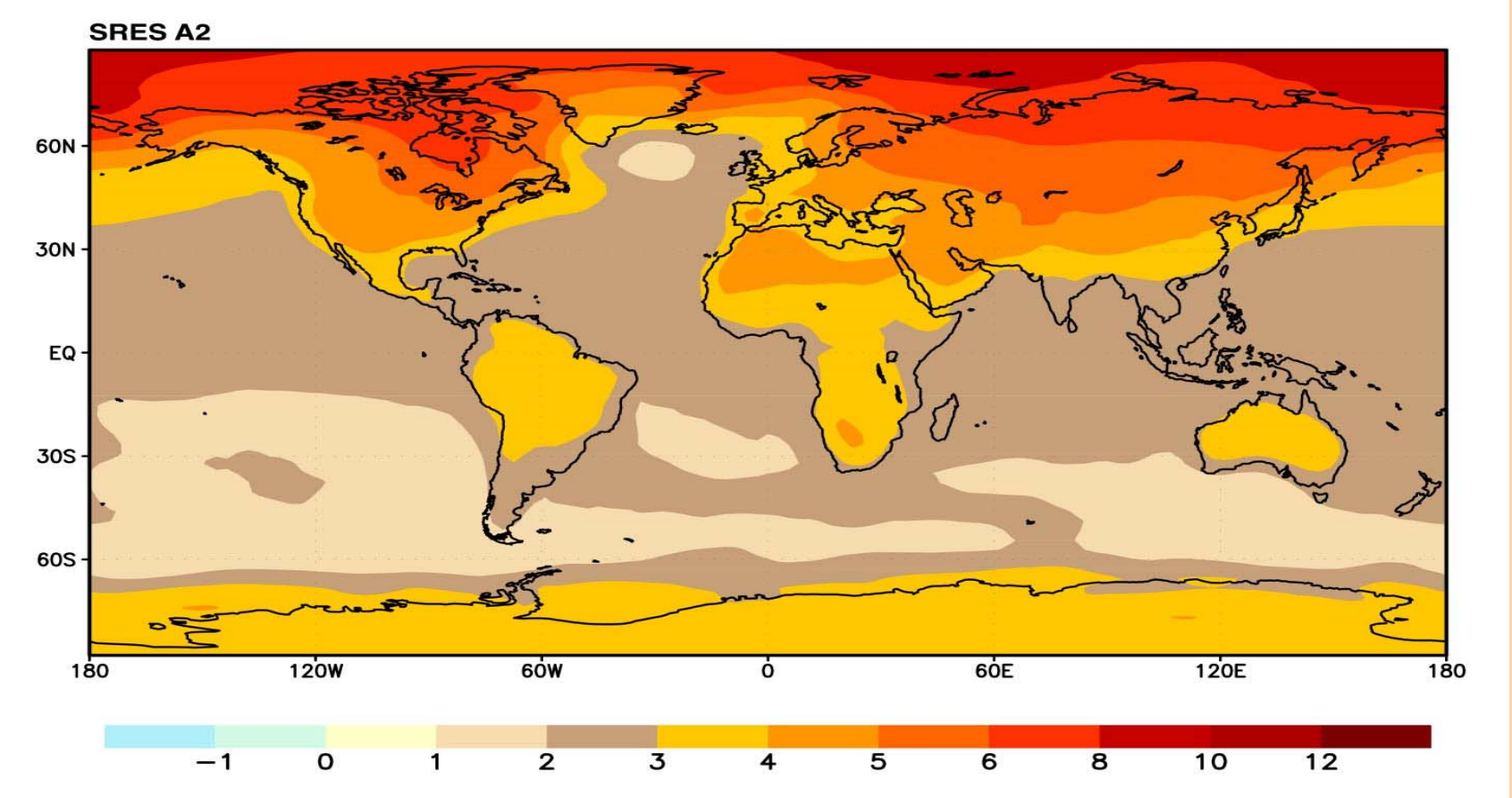
Key Findings on Causes/Projections

- ***There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities***
- ***Human influences will continue to change atmospheric composition throughout the 21st century***
- ***Global average temperature and sea level are projected to rise under all IPCC SRES scenarios***

IPCC Third Assessment Report - Climate Change 2001
Extreme Events

Confidence in observed changes (latter half of the 20th century)	Changes in Phenomenon	Confidence in projected changes (during the 21st century)
Likely[7]	**Higher maximum temperatures and more hot days over nearly all land areas**	Very likely[7]
Very likely[7]	**Higher minimum temperatures, fewer cold days and frost days over nearly all land areas**	Very likely[7]
Very likely[7]	**Reduced diurnal temperature range over most land areas**	Very likely[7]
Likely[7], over many areas	**Increase of heat index[12] over land areas**	Very likely[7], over most areas
Likely[7], over many Northern Hemisphere mid- to high latitude land areas	**More intense precipitation events[b]**	Very likely[7], over many areas
Likely[7], in a few areas	**Increased summer continental drying and associated risk of drought**	Likely[7], over most mid-latitude continental interiors. (Lack of consistent projections in other areas)
Not observed in the few analyses available	**Increase in tropical cyclone peak wind intensities[c]**	Likely[7], over some areas
Insufficient data for assessment	**Increase in tropical cyclone mean and peak precipitation intensities[c]**	Likely[7], over some areas

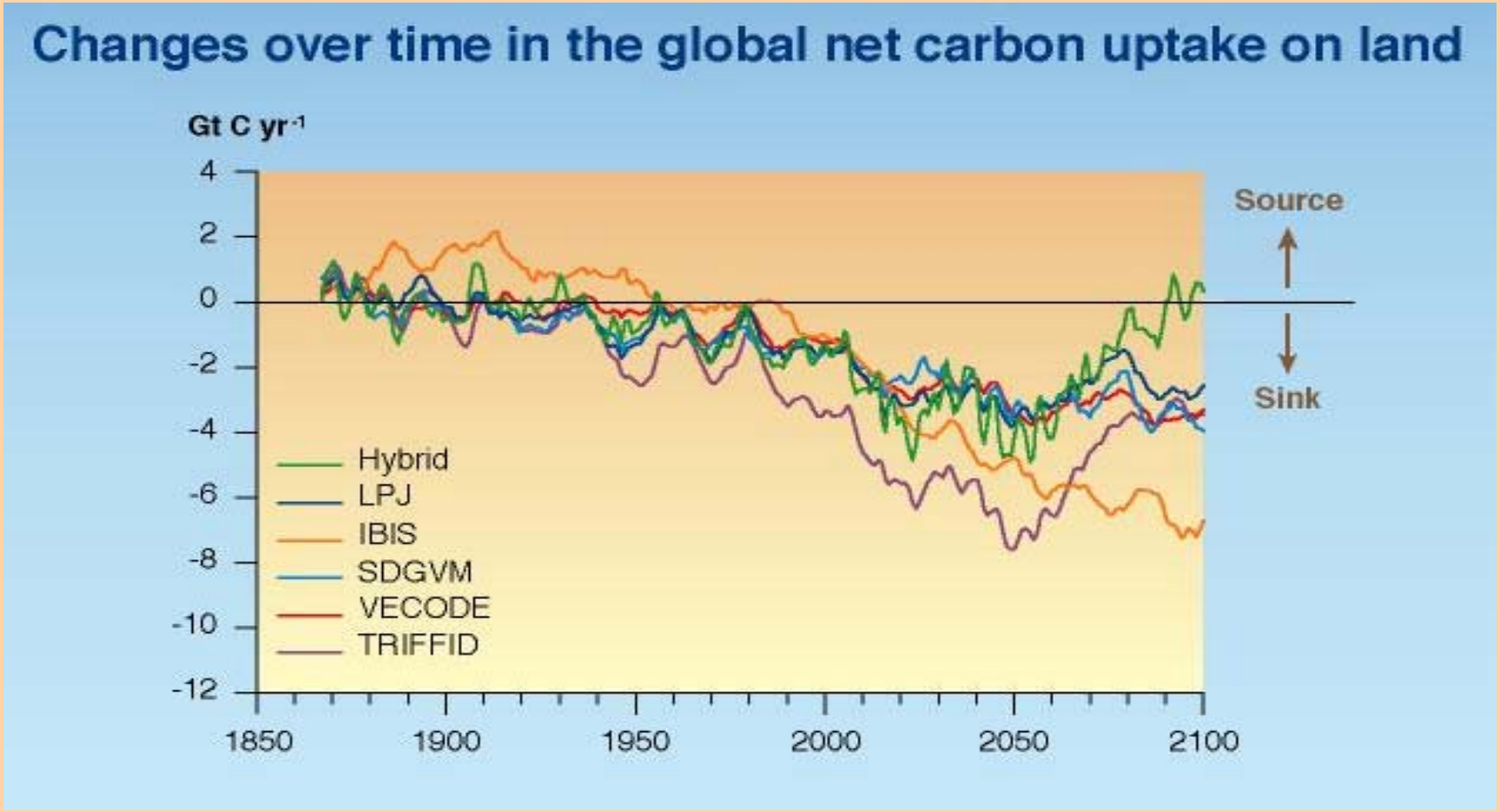
Land areas are projected to warm more than the oceans with the greatest warming at high latitudes



Annual mean temperature change, 2071 to 2100 relative to 1990: Global Average in 2085 = 3.1°C

IPCC Synthesis Report 2001
Part II - Habiba Gitay

Global terrestrial net uptake of carbon peaks during the 21st century then levels off or declines



IPCC Synthesis Report 2001

Part III - David Griggs

Greenhouse Gas Reduction & Offsets

- **Energy and other technological options**
  - **1.9 -- 2.6 Gt C/yr**
- **Land use, land-use change and forestry**
  - **about 1 Gt C/yr**

J. Sathaye
CLA, WGIII, IPPC
July 2001

Kyoto Protocol to the Framework Convention 12-11-97

- Quantified greenhouse gas emissions targets for Annex I countries, which collectively are about 5 percent lower than the 1990 emissions of those countries taken as a group
- Developing country signatories do not have quantified targets

Kyoto Protocol – Key Elements

- **Differentiated Targets**
- **Commitment Period** 2008-2012
- **Six Gases** carbon dioxide, methane, nitrous oxide, HFCs, PFCs, sulfur hexafluoride [@ weighted by GWP]
- **Demonstrable Progress**
- **Flexibility Mechanisms**
  - **Emissions Trading**
  - **Joint Implementation**
  - **Clean Development Mechanism**
- **Land Use & Forestry**
- **Entry into Force**

The Kyoto Protocol

- Mandatory caps on GHG emissions for 37 nations for years 2008-2012
- Emissions allowance trading and joint projects among nations with emissions caps
- Joint projects earning emissions credits between capped and uncapped nations
- Political declaration in favor of mandatory compliance (1.3:1 automatic deduction)

The Kyoto Protocol, cont'd.

- Protocol enters into force when 55 nations representing 55% of industrialized nations' 1990 CO2 emissions have ratified
- Without USA, Russia, Japan, and EU must ratify to bring Protocol into force
- Marrakech agreement provides basis for Russia, Japan and EU to ratify, bringing Protocol into force as early as 2002

Key Elements of Bonn (7/01) & Marrakech (11/01) Agreements

- Relatively full emissions trading market - no quantity restrictions on trading (except “sinks” tons from trees/agriculture)
- Relatively efficient infrastructure for emissions allowance trading - international registries, electronic transfers
- Inefficient infrastructure for approving emissions projects in developing world

Current Action in Key Countries

- EU, Japan 2002 ratification completed
- EU GHG trading system underway
- Russia, Canada ratification deliberations underway.
  - Key players: Duma, Parliament, industries, NGOs

Executive Order 13123, June, 1999 Energy Efficient Management

- Greenhouse Gases Reduction Goal – 30% by 2010
- Energy Efficiency Improvement Goal – 30% by 2005; 35% by 2010
- Renewable Energy Goal – Install solar energy systems; 2,000 by end 2000; 20,000 by 2010
- Petroleum Use Reduction Goals – Through various methods
- Source Energy – Strive to reduce total energy use and associated emissions
- Water Conservation – Reduce water consumption as per agency-established goals

Bush Administration Atmospheric Policies

Announced February 2002

- "Clear Skies Initiative" – concerns plant emissions of nitrogen oxides, sulfur dioxide, and mercury; uses tradable emissions approach
- Global Climate Change – concerns GHG emissions

Bush Global Climate Policies

- Reduce GHG Emission *Rate* (18% 2002-12)
- Improve Measurement, Verification & Crediting of GHG Emissions Reductions via Registry
- Transferable Credit for Emission Reductions
  - ensure that businesses that register voluntary reductions are not penalized under a future climate policy
  - give credit to companies that can show real emissions reductions
- Review Progress on Climate Change; Additional Action if Necessary in 2012
- Funding for Climate Change-Related Programs: FY 2003 budget $4.5 billion for global climate change-related activities -- a $700 million increase

Bush Administration on Global Climate
New US Policies

- Expanded use of renewable energy
- Expanded R&D in climate-related science & technology
- Improvements in the transportation, business sectors
- **Incentives for carbon sequestration**
- Enhanced support for climate observation and mitigation in the developing world
- Better alternative to the Kyoto Protocol

Carbon Sequestration Congressional Legislation

- S. 785 Carbon Conservation Incentive Act (Brownback) 4/26/2001-- Secretary of Agriculture establish program to permit owners and operators of land to enroll the land to increase carbon sequestration
- S. 765 Carbon Sequestration Investment Tax Credit Act (Brownback) 4/24/2001-- Amend Internal Revenue Code to create carbon sequestration investment tax credit
- S. 1255 Carbon Sequestration and Reporting Act (Wyden) 7/26/2001 -- Encourage the use of carbon storage sequestration practices in the U.S.

U.S. Farm Bill – 2001-02 Agricultural Carbon

- Agriculture, Conservation, and Rural Enhancement Act of 2001, S. 1731
- SA 2546 (Wyden-Brownback)
  - Introduced 12/13/01
  - $225M/5 yrs – pilot project grants to universities & producer groups to measure/verify carbon sequestration
  - $500M/5 yrs – private enterprise conservation, including carbon sequestration

State Legislation & Resolutions Involving GHG/Carbon

- Arizona
- California (6)
- Hawaii (2)
- Idaho (1)
- Illinois
- Maine
- Massachusetts (2)
- Michigan
- Minnesota (2)
- Nebraska
- New Hampshire (2)
- North Dakota
- New York
- Oklahoma
- Oregon (2)
- Pennsylvania
- Texas
- Vermont
- Washington (5)
- Wisconsin (2)
- Wyoming

Carbon US Sinks Initiative 2002-07

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- Climate
  - *Technically* – sinks are a significant part of the problem, and of the solution, especially over the next 50 years
  - *Economically* – a necessary part of the least-cost solution
  - *Politically* – hot button issue in Kyoto Protocol process, required element of US policies, with or without KP/KP2
- Biodiversity
  - *Technically* -- actions enhancing sinks often produce biodiversity co-benefits
  - *Economically* -- Financial leverage from multiple benefits
  - *Politically* – conservation community substantially broadens support for climate action

Carbon Sinks Initiative -- 2002-2007

Economic Benefits to Landowners & Communities

- Provide new income stream for landowners
- Community jobs and business for assessment and land management services
- Reduce costs of achieving multiple environmental targets -- greenhouse gas emissions reductions, water quality, habitat improvements, regional air quality

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Carbon Sinks Initiative -- 2002-2007

- “Gold Standard” Initiative
- Policy framework
- Advocacy
- Demonstration projects
- Partnerships/outreach
- International
- Reports/publications
- Public education/strategic communication

Carbon Sink "Gold Standard" Initiative Goals

- **Identify general principles or standards for "gold" (top quality, AAA-rated) forest and agriculture carbon offsets, based on FCA**
- **Develop suite of regional projects in US demonstrating the principles in action**
- **Communicate results to stakeholders & policymakers to create widespread acceptance**

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Carbon Sink "Gold Standard" Development Process

- Technical design
- Scientific review
- Report/publication
- Demonstration project applications
- Evaluation/revision gold standards

Carbon Sinks Initiative -- 2002-2007
Key Partnerships

- Scientists – academic centers, experiment stations
- Resource associations -- conservation districts, public agencies, professional
- NGOs – agriculture & landowner, conservation, environmental
- Economic stakeholders -- landowners, resource & energy industries

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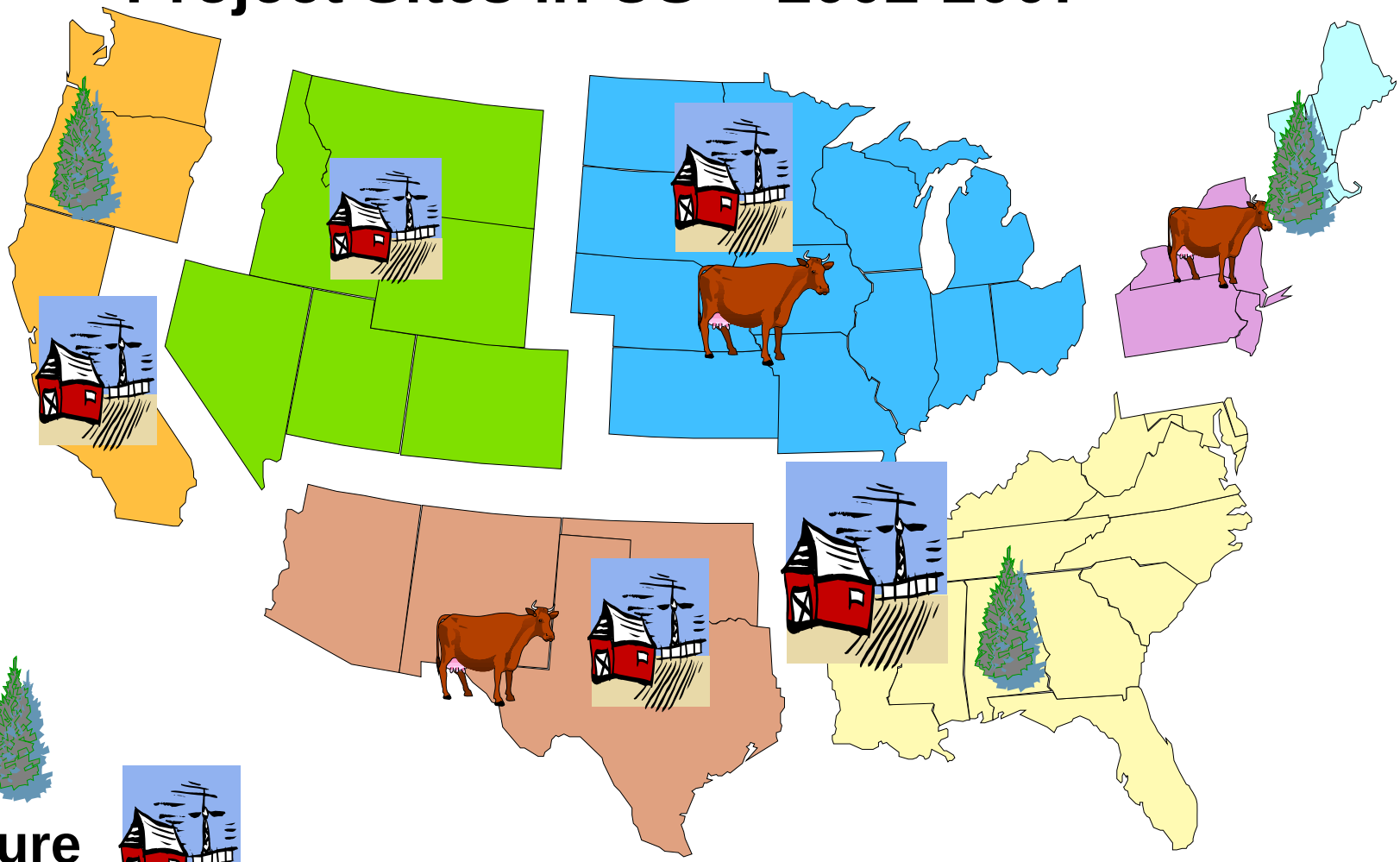
Potential Carbon Sinks Demonstration Project Sites in US -- 2002-2007



Forest

Agriculture

Livestock

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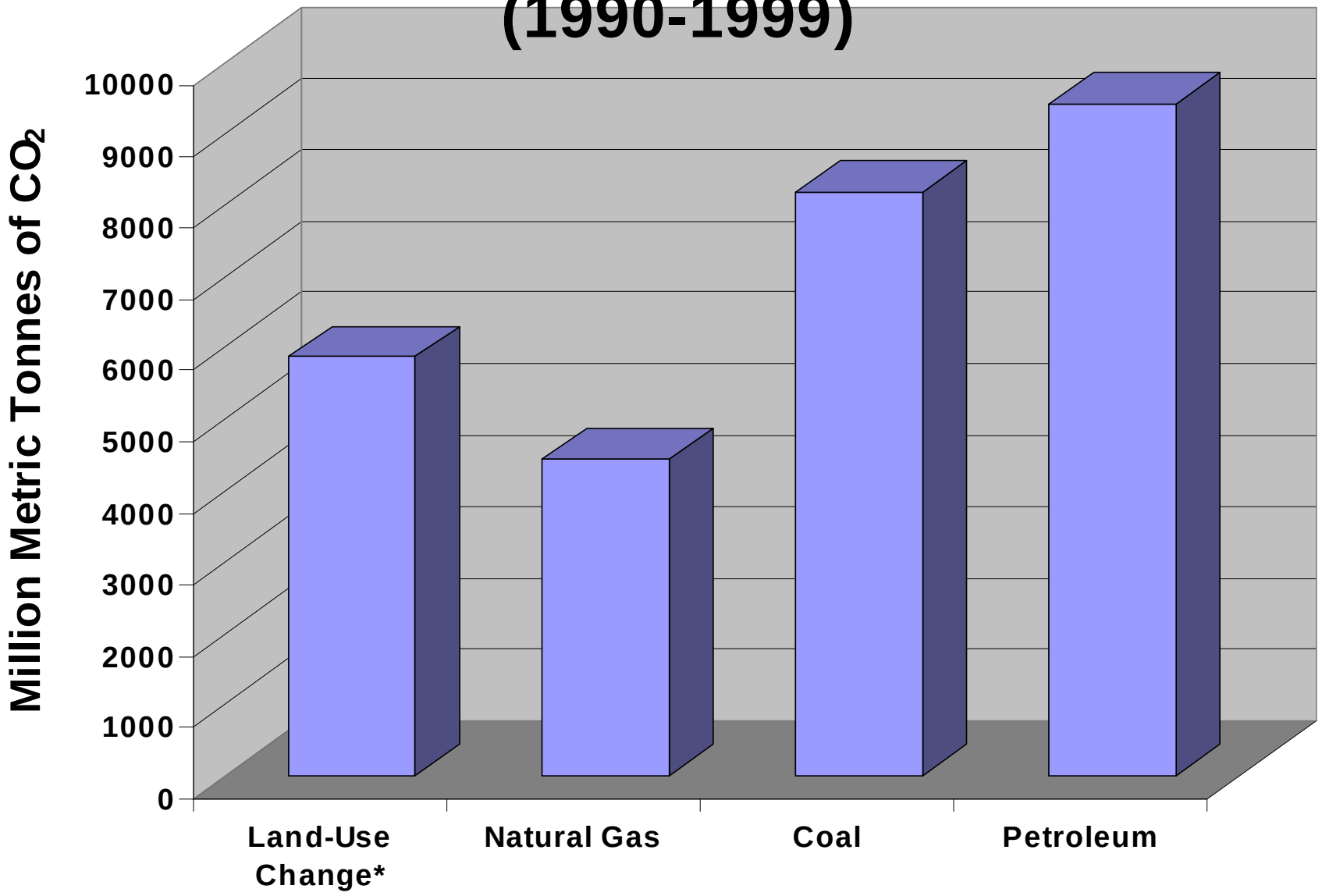
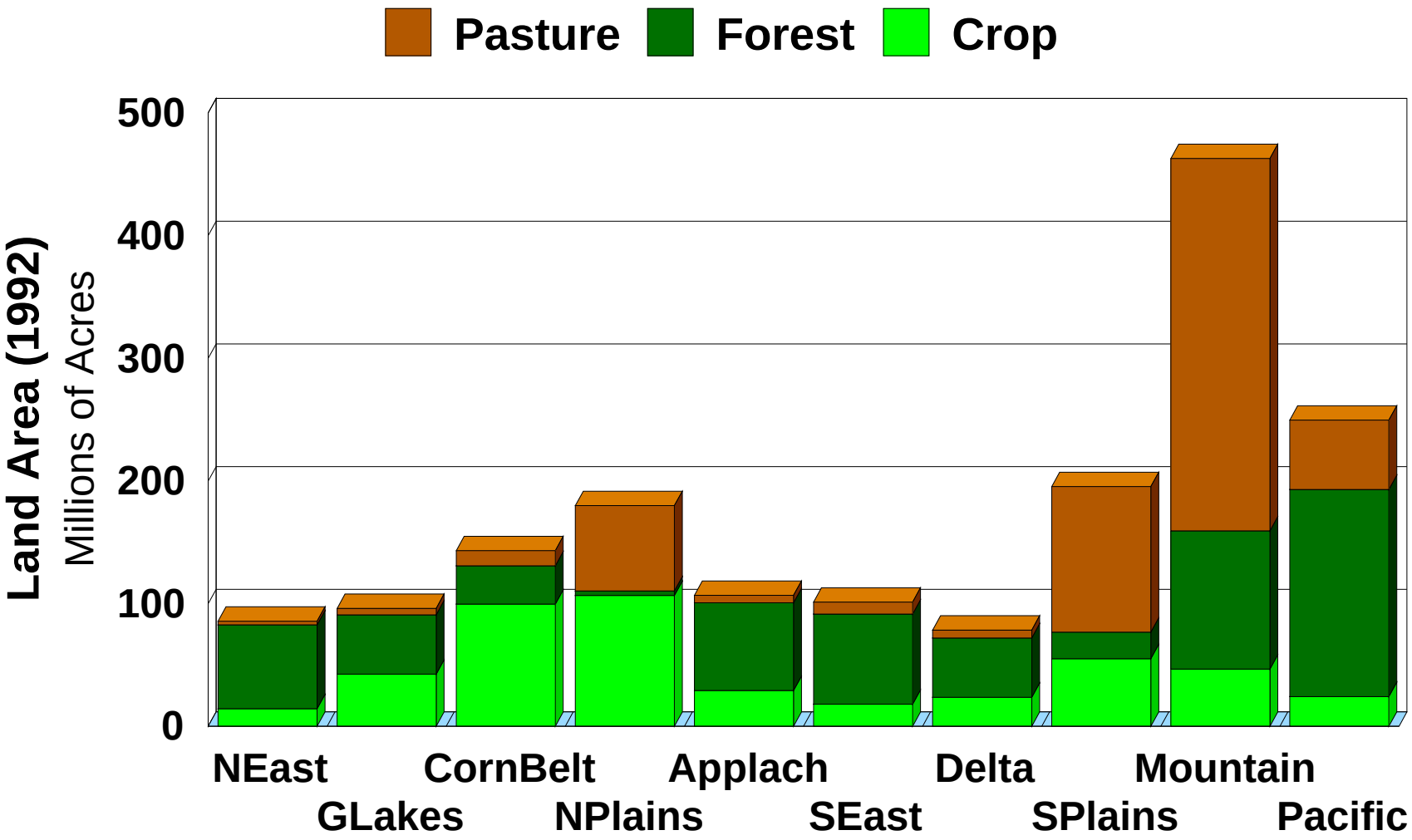
Carbon Dioxide Emissions in U.S. -- Land-Use vs. Fossil Fuels (1990-1999)



Rural Land Uses in the United States



Types of Carbon Sink Projects

- Reforestation
- Avoided deforestation
- Agricultural soil carbon
- Grasslands
- Riparian zones & wetlands

Conditions for GHG Crediting in Agriculture & Forestry Projects

- **Carbon Measurement**
- **Monitoring/Verification**
- **Additionality**
- **Leakage**
- **Transparency**

Carbon Sink Demonstration Projects
Pacific Northwest -- 2002

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- Agricultural
  - PNDSA
  - McElheran Ranch
- Forest
  - Rocking C Ranch
  - Warm Springs Tribes
  - Ochoco Lumber
- Riparian -- Deschutes River basin
- Grasslands – Pine Creek Ranch

Pacific NW Direct Seed Association – Environmental Defense MOA (2000-03)

- *Purposes*
  - Identify new income opportunities for agricultural producers
  - Produce measurable environmental benefits
- *Potential Areas of Collaboration*
  - Soil carbon crediting
  - Water pollution reduction crediting
  - Agricultural product marketing

PACIFIC NORTHWEST direct seed ASSOCIATION

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PNDSA-Entergy Carbon Credit Project Development 2000-02

- PNDSA-EnvDef MOA
  - Investigate carbon, water quality, agricultural economic opportunities
  - Field projects
  - Communication/education
  - Signed in 10/2000
- PNDSA Carbon Sell Offer
  - Estimate C-potentials -- local experts, literature, models
  - Identify terms -- price, contract duration, M&V, risk
  - Draft “1-pager” sell offer summary of terms
  - Entergy agreement 1/2002

PACIFIC NORTHWEST direct seed ASSOCIATION

Entergy

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Agricultural CO2 Emission Offset Reduction Project Interior Pacific Northwest Region

PNDSA-Entergy 2002 Carbon Project Issues (1)

Issue	Technical	Policy	Contract
RMU baseline	X	X	X
ERU baseline	X	X	X
RMU growth	X	X	X
ERU growth	X	X	X
Additionality	X	X	
Monitor/Verify	X	X	X
Pricing	X		X
Liability			X

Agricultural CO2 Emission Offset Reduction Project
Interior Pacific Northwest Region
PNDSA-Entergy 2002 Carbon Project Issues (2)

Issue	Technical	Policy	Contract
Natural Disturbance		X	X
Aggregation		X	X
Grower/field access	X	X	X
Grower/prescript			X
ERU credit disposition		X	X
RMU credit disposition		X	X
RMU lease term		X	X

Wasco Agricultural Carbon Project
McElheran Ranch, Tygh Valley, OR
1999 Contract Terms

- Convert 2,000 A to no-till, direct seed
- Regional demonstration
- Baseline soil carbon measurement by NRCS
- $50,000 from DRC to finance direct seed equipment
- Reduce sediments in steelhead spawning stream
- DRC rights to ½ of RMU offset credits

Direct seeding equipment, McElheran Ranch, 2000

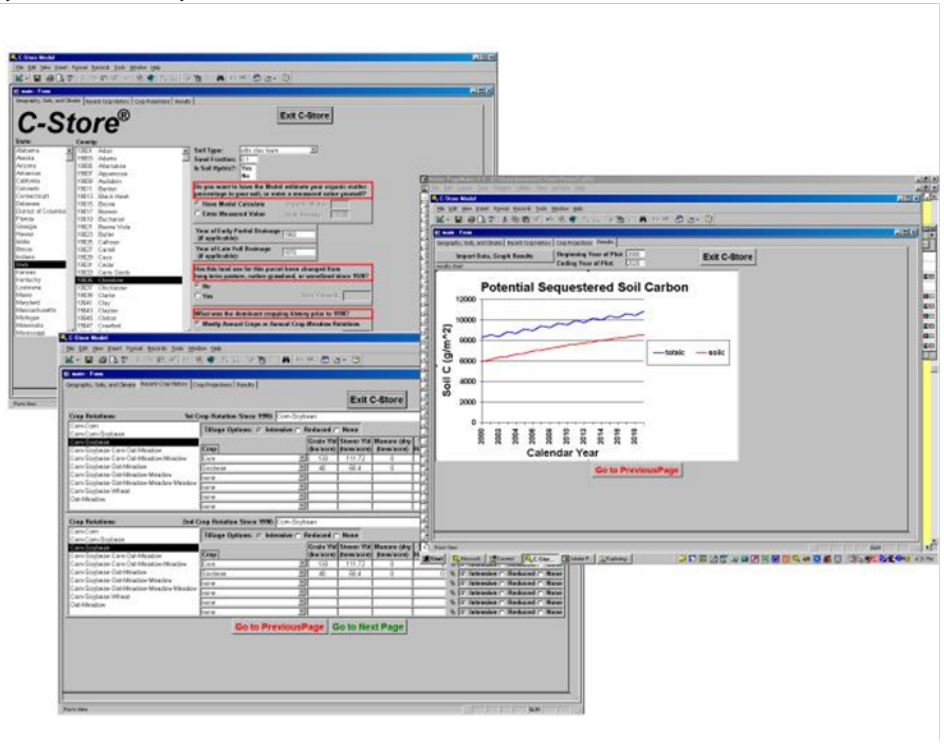
Biodiversity Co-Benefits
McElheran Ranch Project
Deschutes Basin, Central Oregon

White River in north central Oregon, downbasin from McElheran Ranch, provides critical steelhead & salmon spawning habitat

Testing & comparison of CQESTR & CSTORE models

Keith Paustian, Colorado State University
Ron Rickman, Agricultural Research Service (retired)

Sponsored by Environmental Defense
Final Report, June, 2002



Umpqua Forest Project -- Rocking C Ranch, Elk, OR
1999 Carbon Sell Contract Terms

- Oregon Climate Trust buyer
- 120 yr term
- Est. $6.65/T CO2 undiscounted over 1st 10 yrs; $0.31/T over 100 yrs
- Field measurement methods specified
- Buyer may measure future C w/ 3rd party, or use C tables
- Shortfalls 90% CI; dispute resolution via “qualified reviewers”
- Natural disturbance risk to seller

Baseline C measurement, Rocking C Ranch, 1999

Baseline Carbon (tonnes), S. Umpqua parcel, Rocking C Ranch, 1999

Pool	Mean	90% CI (MT)	LowEst (90% CI)	HighEst (90% CI)
Trees	117	93	24	211
Saplings	5	7	0	13
Snags	<0.5	<0.5	<0.5	<0.5
Coarse Debris	17	24	0	41
Understory	17	14	3	31
Litter	34	10	24	44
Soil	608	48	560	655
Total	**798**	**105**	**693**	**904**

Umpqua Forest Project -- Rocking C Ranch, Elk, OR

1999 Carbon Project Issues

- Baseline – T, P, C
- C-growth – T, P, C
- Additionality -- P
- Leakage -- P
- Pricing -- C
- M & V – T, P, C
- Liability – P, C
- Natural disturbances – P, C

Carbon baseline field work, Rocking C Ranch, 1999

T = technical, P = policy, C = contract

Biodiversity Co-Benefits
Rocking C Ranch Forest Project
Umpqua Basin, Oregon

Umpqua River in southwest Oregon, migratory and spawning habitat for steelhead & coho salmon. Rocking C Ranch lands include several miles along the river.

Warm Springs Tribes Forest Carbon Project
Mt. Hood/Mt. Jefferson Region, Tribal Lands, OR
2001 Carbon Offer Terms

- Reforestation: Ponderosa pine tree planting on range/grazing lands
- 55 yr term; 253,000 T CO2 by yr 55; $5.00/T CO2
- Measurement – tree inventory + published biomass, C content
- Field measurement methods specified
- Buyer may measure/verify future C w/ 3rd party
- Self-insured for shortfalls, natural disturbances -- tons offered 75% est yr 55 total C, 50% est yr 120 total C; uneven aged stands, old growth tribal goals

Tribal forests, Warm Springs River, 2000

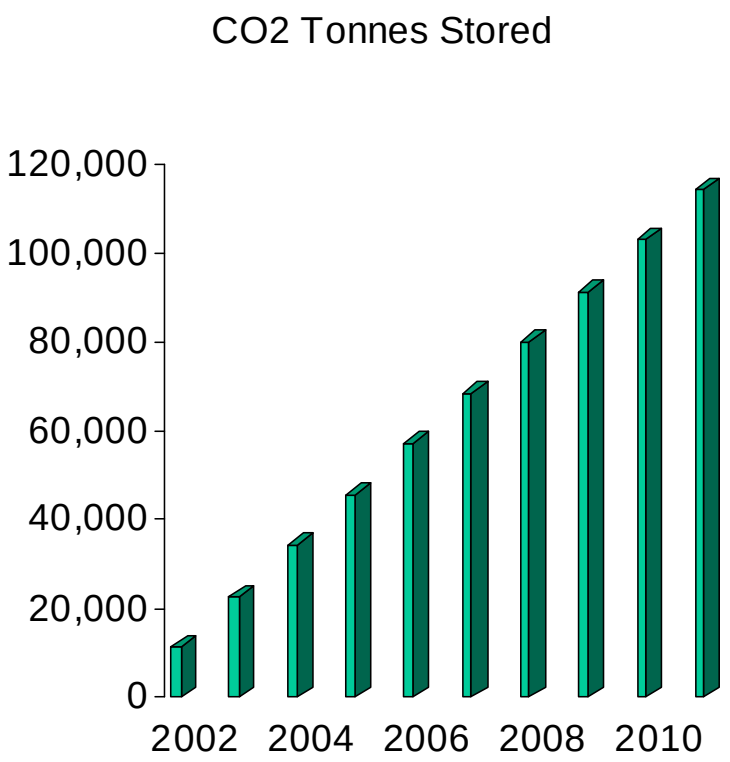
Warm Springs Tribes Forest Carbon Project
Mt. Hood/Mt. Jefferson Region, Tribal Lands, OR
2001 Carbon Project Issues

- Baseline – T, P, C
- C-growth – T, P, C
- Pricing -- C
- M & V – T, P, C
- Liability – P, C
- Natural disturbances – P, C

Cattle grazing, near Tribal forests

T = technical, P = policy, C = contract

Foley Creek Carbon Project
Ochoco Lumber, Prineville, OR
2001 Contract Offer Terms



- Forest management: tree planting/spacing, deferred harvest
- 34,000 A; 11,400 T CO2/yr
- Measurement – tree inventory + published biomass, C content
- 10 year lease, renewable
- $0.40/T/CO2/Yr ($5.00/T/CO2 @ 8%)
- 3rd party verification, adjustments in payments

Foley Creek Carbon Project
Ochoco Lumber, Prineville, OR
2001 Carbon Project Issues

- Baseline – T, P, C
- C-growth – T, P, C
- Additionality -- P
- Leakage -- P
- C in wood – T, P, C
- Lease – P, C
- Pricing -- C
- M & V – T, P, C
- Liability – P, C
- Force Majure – P, C

Foley Creek Ponderosa Pine

T = technical, P = policy, C = contract

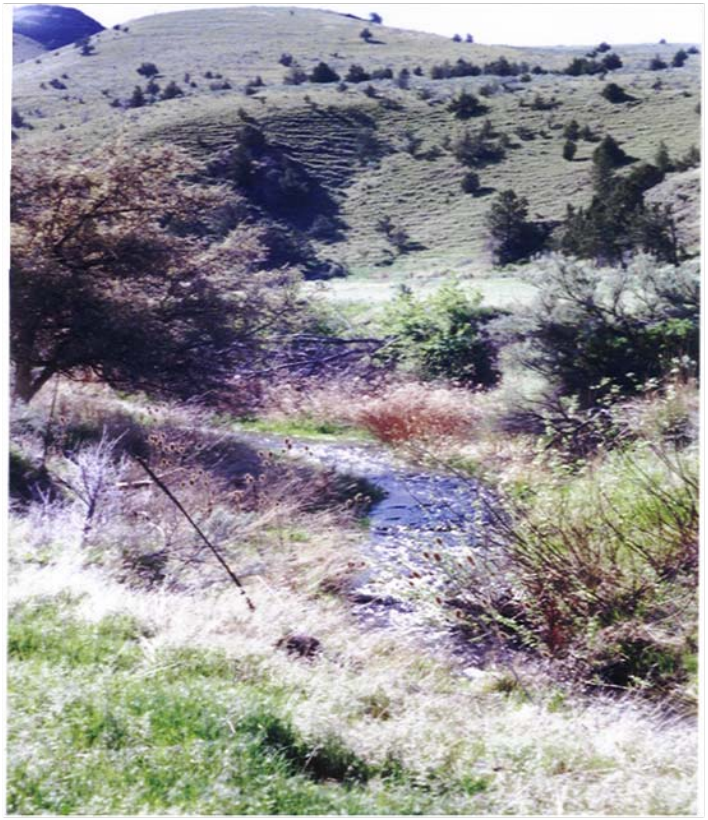
Riparian Restoration Carbon Project
DRC, Deschutes Basin, OR
2002 Carbon Sell Contract Terms

- Climate Trust buyer
- Reforestation/revegetation: 35-180 ft buffer from streams, lakes, wetlands
- 50 yr term
- Est. $3.34/T CO2 undiscounted over 50 yrs (planting/$ over 5 yrs)
- Site management plan for each participating landowner – contract w/ DRC
- Buyer may measure future C w/ 3rd party
- Shortfalls/natural disturbance risk to DRC

White River, a tributary of Deschutes River

Riparian Restoration Carbon Project
DRC, Deschutes Basin, OR
2002 Carbon Project Issues

- Baseline – T, P, C
- C-growth – T, P, C
- Pricing -- C
- M & V – T, P, C
- Liability – P, C
- Natural disturbances – P, C



Crooked River tributary of Deschutes River

T = technical, P = policy, C = contract

Grasslands Restoration Carbon Project
Pine Creek Ranch, John Day Basin, OR
2001 Carbon Measurement Project

- 24,000 A cattle ranch convert to native grasslands
- Baseline field plots – litter, fine/coarse woody debris, live/dead standing trees, non-tree standing vegetation

Uplands, Pine Creek Ranch

Grasslands Restoration Carbon Project
Pine Creek Ranch, John Day Basin, OR
Carbon Project Issues – 2002-03

- Baseline – T, P, C
- C-growth – T, P, C
- Pricing -- C
- M & V – T, P, C
- Liability – P, C
- Natural disturbances – P, C

Bottomlands, Pine Creek Ranch

T = technical, P = policy, C = contract

PCA Partnership for Climate Action

Environmental Defense
finding the ways that work

PCA partners have a market capitalization of $360 billion in key industrial sectors

ALCAN

bp

DUPONT The miracles of science

Entergy

ONTARIO POWER GENERATION

PECHINEY

Shell International

SUNCOR ENERGY

PCA Partnership for Climate Action

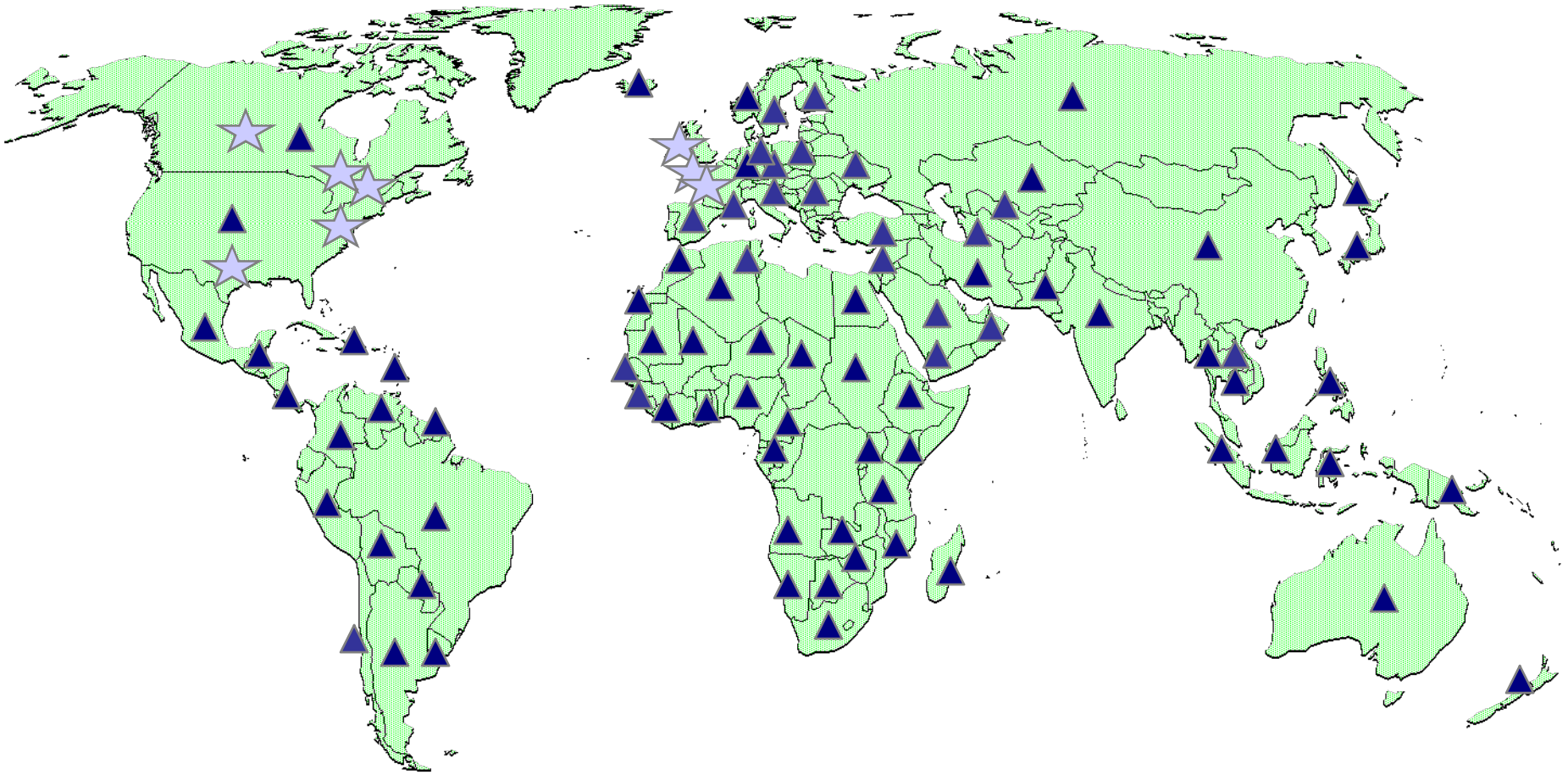
e
ENVIRONMENTAL DEFENSE
finding the ways that work

Commitments of the Partnership

- Publicly declare global GHG emission target (with real plan to meet goal);
- Measure, track, and publicly report net GHG emissions;
- Share best practices with PCA members, customers, suppliers;
- Lead through example.

Together, PCA has an immense global span

company headquarters countries with operations



Compared to industrial countries, PCA ranks 12th in emissions